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Effect of flotation reagents on the adsorption of gold by activated carbon

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ABSTRACT

The use of activated carbon in gold extraction is one of the most established methods for the recovery of gold from a leach solution. This is due to its lower operational cost and its ability to produce gold bullion with good purity compared to other methods such as cementation. Flotation of sulphide gold ores is commonly used as one of the beneficiation processes before leaching. However, the type and dosage of flotation reagents can affect downstream processes due to their fouling effect on granular activated carbon. This study aims to investigate the fouling effect of the most widely used flotation reagents namely potassium amyl xanthate and methyl isobutyl carbinol on the loading capacity and adsorption kinetics of gold onto the activated carbon. Experiments to determine fouling effect of activated carbon caused by flotation reagents were conducted in five steps. These included preparation of a gold standard solution, fouling of the activated carbon, carbon activity test, solution sample analysis and carbon analysis.

The results indicated that fouling of the activated carbon led to a lower adsorption rate and loading capacity of gold. The fouling due to potassium amyl xanthate was found to be more significant compared to the fouling due to methyl isobutyl carbinol. In both systems, the effect was more pronounced with a high concentration of flotation reagents and a lower concentration of the activated carbon in the system. This suggests that the use of a high amount of flotation reagents should subsequently be complimented by high carbon addition in order to minimize the effect of the flotation reagents during the gold adsorption stage. This however, will effectively have an impact on the operational costs.